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THE CONDOR

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Issued December 20, 1923

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Volume XXV **November-December, 1923** **Number 6**

[Issued December 20, 1923]

THE BUFF-BREASTED FLYCATCHER IN THE HUACHUCAS

(WITH FOUR PHOTOS)

By FRANK C. WILLARD

EARLY in June, 1897, I was climbing the last slope up to the main ridge of the Huachuca Mountains in Cochise County, Arizona. During a pause for breath, a small bird flitting about among some young pine trees five or six feet tall caught my eye, and a few moments of observation convinced me that it was another of the numerous strangers to me. This was my first year in the West, and nearly every day was bringing new acquaintances. While I was debating the probable identity of this flycatcher, as its actions and appearance betokened it, the bird dropped to the ground, picked up a fine rootlet, and flew up into one of a group of tall pines about seventy-five yards away. I could not locate the exact point of alighting and, fearing to disturb its nest building, hurried away with the determination to return later, locate, and collect the nest, establishing the identity meanwhile. That night Coues' Key solved another problem and I knew the Buff-breasted Flycatcher (*Empidonax fulvifrons pygmaeus*) by name as well as by appearance. A week later I was standing near the pine tree where the bird had been last seen. A club thrown among the branches flushed her, as the alarm note she uttered announced; but I could not see her, nor could any sight of the nest be obtained. Strapping on my climbers, I was soon astride the first branch forty feet up. A careful scanning of all the nearby branches failed to reveal the nest, and I stood up and clasped my arms around the trunk of the tree preparatory to climbing higher. Something soft gave under my hand and I knew without looking that it was the nest. Hastily climbing to the branch above, I looked down into a small, deeply hollowed cup, snug against the trunk and saddled on a short stub about three inches in diameter. Another longer stub was a few inches almost directly above it. Three cream colored eggs were the contents. While I was busy packing them, the female came close, scolding vigorously.

Few other opportunities for observing the buff-breast presented themselves and until the year 1907 I saw but one other nest. In July, 1899, a set was secured from a nest, similarly situated, by O. W. Howard and me. This nest contained four fresh eggs. The two foregoing nests were at an altitude of 8500 feet, on the ridge at the summit and in an open pine forest.

May 6, 1907, while I was photographing a giant mescal stalk, the unmistakable call of a Buff-breasted Flycatcher caused me to suspend operations. It was repeated and while I noted the direction, a bird was seen to fly from a small white oak some distance above me on the steep mountain side. In a few minutes she returned to the same tree and alighted near the tip of a lower horizontal branch. Focusing my opera glasses on the spot I saw her busily arranging material on the edge of a half-completed nest. I was

Fig. 51. TYPICAL NESTING GROUND OF THE BUFF-BREASTED FLYCATCHER; ELEVATION 7000 FEET, IN THE HUACHUCA MOUNTAINS, ARIZONA.

unable to revisit this locality until the 23d. The male then proclaimed my approach and flew from tree to tree up the mountain, calling at short intervals. I was soon at the tree and saw the female on the nest. Her big, bright eyes were watching anxiously, yet she remained on the nest until I was almost within reaching distance. She left the nest as it was jarred by my approach, and I was presently rejoicing over a set of four beauties, in-

cubation well begun. The nest was twelve feet up from the ground, saddled on the lower prong of a fork, the upper prong forming a protective overhang. A photograph of the nest and eggs *in situ* was obtained.

On the 28th, I was doing some exploring with Mr. W. A. Johnson in an adjoining canyon. Our eager ears soon heard the wished-for call, and we scrambled up the steep slope as it sounded from tree to tree above us. Suddenly it ceased, and we had not caught a glimpse of the bird. We waited, but heard no further sound. While scrambling up we had carefully examined each oak but found no signs of the nest. Returning to the bottom, we had scarcely picked up our outfit, when we were again saluted with the call of

Fig. 52. COLLECTING A NEST AND EGGS OF THE BUFF-BREASTED FLYCATCHER.

warning given near us, and a hasty look in that direction showed us the male in the top of an oak. The proceedings of the previous minutes were repeated, but this time with the bird in sight. When we were well up the slope again and nearly winded, the sly fellow ceased his 'quit-quit' and soon returned to a tree near his point of departure. Sliding and falling, we hurried down, but he flew out of sight. A careful search of each branch of every nearby oak was without result except the discovery of a Hepatic Tanager's nest in one of the few scattered pines which towered above the oaks. While I was col-

lecting this, we were again tantalized by that 'quit-quit-quir-r-r.' The male tanager was hopping about among the topmost branches of a pine tree not far from the one in which I was perched. He was being followed and scolded by the flycatcher in which we were so much interested. As I watched, the tanager flew away, and soon the flycatcher dropped down to a lower

Fig. 53. Buff-breasted Flycatcher on her nest in a white oak.

branch, well out toward the tip, and disappeared. I knew what that meant and lost little time in making my descent. There, in plain sight, was the nest, about forty-five feet from the ground. With the aid of a rope, I secured this set while Mr. Johnson took a snapshot of the operation. This nest was saddled on the lower prong of a fork and overhung by the upper,

as was the other nest. All nests examined were similarly located. Incubation was fresh in every instance where the set was collected, except the one taken on the 23d. Nests were taken on the 28th and 29th and on June 7, in 1907. On June 7, also, a nest with eggs about to hatch was found.

The nest is composed largely of lichen-like leaves, dark gray in color, of a small low growing weed. These are held together with cobwebs. The lining is of fine grass, rootlets, and hair, with a few feathers near the rim, which is slightly incurved like a hummingbird's nest. It is rather insecurely fastened with cobwebs to the branch on which it rests. In appearance, it is much like a Western Gnatcatcher's (*Polioptila caerulea obscura*) nest.

Observations made during 1908 and later lead me to believe that the Buff-breasted Flycatcher suffers considerably from having its nest robbed

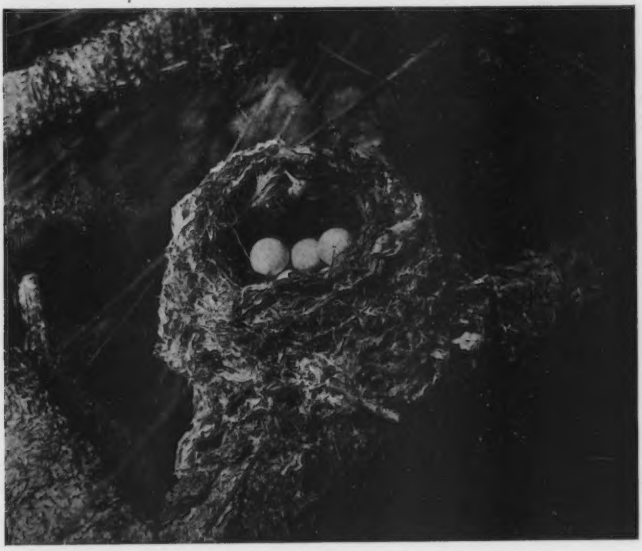

Fig. 54. NEST AND FIVE EGGS OF BUFF-BREASTED FLYCATCHER, IN SITU, 60 FEET FROM THE GROUND.

by the Long-crested Jay (*Cyanocitta stelleri diademata*), and also from its being blown down by severe winds. A heavy wind on May 29, 1908, blew down two nests of this flycatcher and two of Coues Flycatcher (*Myiochanes pertinax pallidiventris*). The buff-breast is also given to deserting an unfinished nest when even slightly disturbed. If there are eggs in the nest, however, she will not desert it, even if it is frequently investigated. The photograph of the bird on the nest was taken at a distance of four feet and is from one of several exposures made at varying distances. It was taken with a 4 x 5 camera which required careful focusing after each move, but the bird did not seem particularly worried except by a ray of sunlight which struck her when the wind moved the leaves which shaded her.

In leaving a nest built high up from the ground, the female drops almost straight down to the brush below and does not make a sound for some time. The male seems to give the signal to her and he does most of the scolding, flying from tree to tree and endeavoring to lead the intruder away. When the nest is discovered, and the birds realize it, the female becomes very bold and alights on the nest where she remains, frequently until nearly touched. The male takes his departure about this time.

During the nest building the male stays pretty close to the nesting tree, but offers no assistance except to drive off intruding birds. He is good at that and can also put big squirrels to flight. The female works persistently and rapidly, but the nest requires a lot of material and she often takes ten days to build it. She sits on the nest for short periods before the eggs are laid, and also as the eggs are laid, but does not seem to make a real business of it until the set is complete. Four eggs comprise the usual clutch. In a few instances I have found but three eggs, and in one instance, only, did the nest hold five.

One of the illustrations shows the usual character of the country where the buff-breast nests. A pine tree is by far its favorite choice, but the white oak which grows among these scattered pines at the lower levels of its range is well liked. From an altitude of 6500 feet up to the tops of the ridges which reach 8500 feet is the range of this species, usually in the lower 1000 feet, however. An open mountain side, well covered with brush and with a few scattered pines, is typical nesting country.

Other species are likely to nest in the same tree with the Buff-breasted Flycatcher. I have found the following species thus associated: Hepatic Tanager, Grace Warbler, Rivoli Hummingbird, Lead-colored Bushtit, Western Evening Grosbeak, and Coues Flycatcher.

During the season of 1922, I revisited some of my old haunts in company with Mr. A. C. Bent. Several of the pairs were found just where I used to find them eight years ago. There was not so many as there used to be and I was able to collect only one set of three, from a typical nest in a pine tree. Another nest was located, but jays or squirrels destroyed it. The eggs taken this season are normal in size and measure .66 × .51, .67 × .52, and .69 × .53 inches.

Farmingdale, Long Island, New York, April 18, 1923.

FURTHER OBSERVATIONS ON THE COSTA HUMMINGBIRD

(WITH THREE PHOTOS)

By ROBERT S. WOODS

THE COSTA Hummingbirds (*Calypte costae*) arrived very early in the San Gabriel Valley this year and seemed more numerous than usual, so an opportunity was afforded to add a few more facts to those set down in these columns last year.

The first adult male was noted at Azusa, California, on March 16, 1923. On March 29, I found a nest being built, of which only the bottom had

Fig. 55. COSTA HUMMINGBIRD ON NEST; AZUSA, APRIL 20, 1923.

been completed. By April 6 one egg had been laid. On April 12 three more nests were discovered, each containing two eggs. All of these nests were in bushes of the *Feijoa sellowiana,* or Paraguay Guava, at heights ranging from two to four feet, the height in every case being approximately one-half of the total height of the bush. The method of placing the nest varied considerably, however. The first one mentioned was rather precariously situated on a nearly vertical branch and tied to a leaf on the other side. After the young had been hatched the nest disappeared, from what cause I do not know. The nest shown in the first illustration was on a small horizontal limb, without bracing, and was tilted and appeared rather insecure before the young had left it. The other nests were firmly placed, especially that shown in figure 56. This hummingbird, contrary to the general rule,

would allow one to approach almost within arm's length before leaving her nest. The exterior of the remaining nest was almost covered with small scraps of paper.

The dense foliage of the orange trees, so much favored for nesting purposes by many other birds, is not to the liking of the Costa Hummingbird, although it obtains most of its food from the orange blossoms at the time the first nests are being built.

As to the period of incubation for hummingbirds in general, I find the following in The Hummingbirds, by Robert Ridgway (Report of National Museum, 1890, p. 284): "According to Mr. Gould two broods are produced in a season, the period of incubation occupying 12 to 14, or according to Captain Lyon, 18 days." The last figure seems to be the correct one, at least for the Costa Hummingbird. The hummingbird, then, is a decided ex-

Fig. 56. A WELL-PLACED NEST OF THE COSTA HUMMINGBIRD; AZUSA, APRIL 19, 1923.

ception to the rule that the time of incubation is proportional to the size of the egg.

The egg found on April 6 hatched on April 24. The eggs in the nest of figure 55 hatched six days earlier, and the young left on May 10 and 12. On May 7 I saw a young hummingbird, apparently a Costa, already able to fly well; so it would follow from this that eggs must have been laid well before April first.

The last egg in the four nests was hatched on April 26 or 27. The time spent in the nests by the three sets of young which were successfully raised was in each case 22 or 23 days. In one of these cases (fig. 56) only

one egg was hatched, but as the time required for development was the same, it is evident that the relatively greater supply of nourishment which might be expected to be available for this young bird had no effect in hastening its growth.

The unusually early nesting this year gave time for a second brood, but whether full advantage of this was taken is doubtful, as only two more nests were found, and one of these may have been built by the bird whose family met with disaster.

On May 18 a partly finished nest was noted. The location was rather unusual and apparently ill-considered, being near the end of a slender, drooping branch of an avocado tree, which would be whipped about severe-

Fig. 57. Nest and eggs of Costa Hummingbird; Azusa, May 24, 1923.

ly by the wind. The set of two eggs was completed on May 23 (fig. 57), but a few days later only one egg remained, and the nest had been abandoned.

The situation of the remaining nest was much the same except that the branch on which it rested was more rigid, and the nest was more closely surrounded by foliage than any other that I have seen. When first discovered on May 24, it contained two eggs, which were hatched on June 2 and 3. Allowing 18 days for incubation, it may be seen that the only bird which could have been through with her first brood in time to build this nest would be that one whose young was noted on May 7. The owner of the nest also agreed with the mother of the aforementioned young in the exceptionally dark color of the underparts. When the young were half-

grown, the nest gave way on one side, probably having been tilted by further drooping of the branch, allowing one of the young to fall to the ground and perish. First aid in the shape of a string to hold up the end of the twig saved the survivor from danger of meeting a similar fate.

These instances seem to indicate that instinct is not a sufficient guide, but that some individual judgment is required to insure a safe nest. The long time that a Hummingbird's nest is used, as well as its frail construction, of course makes it especially subject to decay and to damage by the elements.

The young bird last mentioned occupied the nest no less than thirty days from time of hatching, and when finally large enough to leave, it was unable to fly, evidently being undernourished or defective in some way. As no other young birds were in evidence during the latter part of the season, I am inclined to believe that a second brood is not normal for the Costa Hummingbird in this locality.

After the orange blossoms were gone, the male Costa Hummingbirds for the most part retired to the adjacent brush land, where the white sage (*Ramona polystachya*), stone-crops (*Dudleya*), Pentstemon (*P. spectabilis*) and scarlet larkspur (*Delphinium cardinale*) provided an abundance of food until July owing to the continued cool weather of the early summer. While most of the adult males left during the month of June, as has been their habit, one remained as late as July 12.

It may be of interest in this connection to compare the two local species of the genus *Calypte* in respect to their so-called "nuptial flight", which as a matter of fact is as often as not directed toward birds of some other sort which they wish to drive away. The nuptial flight of the Anna Hummingbird (*C. anna*) has been well described by Mr. Richard Hunt (Condor, XXII, 1920, p. 109). I have several times this year seen this identical performance enacted. In this case the abrupt utterance at the lowest point of the circuit resembled the sharp bark or chirp of the Ground Squirrel so closely that I was at first deceived by it. The path of the Costa Hummingbird's nuptial flight is nearly circular though irregular at the top, or sometimes U-shaped. The only vocal sound accompanying it is a sustained shrill whistle starting when a considerable velocity has been attained on the downward course and ceasing when the momentum acquired has been expended after sweeping through the wide arc at the bottom.

The flight of the Costa, like that of the Anna Hummingbird, lacks the pronounced metallic or rattling sound which in some degree characterizes the flight of male hummingbirds of the other Californian genera. In localities where the Anna and Costa are the common hummingbirds, the presence of another species may often be first detected by the sound of its flight, while the Costa Hummingbird is announced by the shrill whistling notes of the male, and the Anna by its squeaky song.

Los Angeles, California, July 20, 1923.

THE CAYENNE OR RIVER IBIS IN BRITISH GUIANA

(WITH ONE PHOTO)

By CASEY A. WOOD

CHARLES CHUBB (Birds of British Guiana, 1916, p. 147) has furnished us with practically all that we know about that interesting species, the Cayenne or River Ibis. In his account he states that there is no authentic record of its breeding season or of its nidification. That I am in a position to supply a few notes on these points is my apology for the following. Chubb gives a brief systematic description of the bird, the substance of which I quote herewith.

Harpiprion cayennensis. CAYENNE IBIS.

Harpiprion cayennensis (Gmel.), Syst. Nat. i. p. 652, 1789 ("Habitat in Cayenna"); Salvin, Ibis, 1886, p. 172 (Bartica Grove, Camacusa); Quelch, Timehri (2) ii. p. 373, 1888 (Abary River), iv. p. 334, 1890 (Berbice River), v. p. 107, 1891 (Georgetown); Sharpe, Cat. B. Brit. Mus. xxvi. pp. 25, 265, 1898; Brabourne & Chubb, B. S. Amer. i. p. 47, no. 448, 1912.

Ibis cayennensis Cab. in Schomb. Reis. Guian. iii. p.. 757, 1848.

Ibis infuscata (nec Licht.), Cab. in Schomb. Reis. Guian. iii. p. 756, 1848; Brown, Canoe and Camp Life, p. 21, 1876 (Cuyuni River).

Phimosus infuscatus (nec Licht.), Salvin, Ibis, 1886, p. 171; Beebe, Our Search for a Wilderness, p. 253, 1910 (Cuyuni River). "Curi-curi" or River-Ibis (*Brown*); "Bush Curi-curi, Bush or Bronze Ibis" (*Quelch*).

Adult Male. General colour above and below oil-green with coppery reflections on the back and steel-blue on the quills and tail both above and below; under surface not so bright and mixed with dull black; top of head, sides of face, and throat dusky grey, somewhat darker on the throat; nape and hind-neck bright green. "Bill and feet light green" (*Brown*).

Total length 500 mm., culmen 103, wing 279, tail 141, tarsus 58. *Adult female.* Similar to the adult male. Wing 315 mm.

The description is based on an example obtained on the Abary River in September, 1906. *Range in British Guiana.* Upper Tukutu Mountains, Ituribisi River, Curubung River, Bartica, Abary River, Mazaruni River, Arwye Creek (*McConnell collection*); Bartica, Kamakusa (*Whitely*); Cuyuni River (*Brown & Beebe*); Berbice River, Georgetown (*Quelch*). *Extralimital Range*, Brazil, Colombia, Ecuador, Peru.

Habits. Schomburgk remarks (*Reis. Guian.* vol. ii, p. 503):—This species is fairly common and found mostly in pairs, and is not of a very shy nature. It seeks its food, which consists of water-insects, etc., on the edges of rivers. Towards dusk they fly away to roost in the woods. [See, also, translation by W. E. Roth, 1922.] This species lives singly or in pairs on the Savanna swamps and on the borders of the rivers. I have found it at an altitude of 1500 ft., but I was unable to discover its nest. The "Warraus" call it Korro-korro. Barrington Brown (Canoe and Camp Life in British Guiana, 1876, p. 22), gives the following note:—"The Curi-Curi or River Ibis (*Ibis infuscata*) gets its name from its cry, which resembles that word repeated a few times; they are of a dull olive-green colour, with light green bills and legs. They drill holes in the mud-banks with their long bills for worms, feeding after the manner of snipe." Mr. J. J. Quelch met with this species on the Abary River, and remarks that it rose at intervals from the bushes. He also observed it on the Berbice River and at Georgetown.

There is no additional reference to this bird in Chubb's second volume, published in 1922.

In February, 1922, while on a journey in the interior of British Guiana with four other white men, all more or less interested in ornithology, we saw

at rather close range, many South American birds, and had an unusual opportunity of studying their appearances and poses as well as an occasional nest. We were particularly fortunate in the case of the Bush Ibis. During the outward journey, on the upper Essequibo, while our boat was only a few yards from the shore, we surprised a solitary individual, evidently feeding, on the muddy bank of the stream. He did not appear to be frightened and did not at once take flight. As our Indian crew ceased paddling and we all kept still and quiet, we were able to inspect the bird at our leisure. Even if we

Fig. 58. Nest of the Bush or River Ibis in British Guiana.

had been in any doubt as to its identity, the exclamation of the paddlers, "curri-curri", would have prompted us. The day was rather overcast (the downpours were frequent) and that may have been the reason why we all agreed that the gray and green shades of the ibis' plumage, as well as of its mandibles and feet, appeared definitely *dark* instead of the light shades recorded by Barrington Brown and others. On the other hand, the iridescent sheen of the back and the bluish of the tail were strongly in evidence.

Farther inland, some 200 miles from the coast, above the junction of the

Essequibo with the Potaro, we saw another individual, with precisely the same markings, roosting on a large tree overhanging the water. Our boat carefully approached this bird, and again we had an excellent opportunity of examining him before he flew into the jungle. On paddling close to the branch on which the ibis had been roosting—less than ten yards from our eyes—we spied a nest that had been built some twenty feet from the river bank and the same distance from the surface of the stream. It was well sheltered from the tropical sun and rain by dense foliage above and on one side, though quite exposed toward the south. The nest itself, some fourteen inches in diameter, was loosely constructed of dry twigs lined with finer material, that may have been moss. In any event, it was possible to see all the rough, outer structure of the nest but not its contents. Peering over the margin of the structure were the heads and necks of two nestlings fairly feathered in dark gray, with wide-open eyes, mandibles undeveloped but showing the ibidine type. The nest was deep enough entirely to hide the youngsters when they withdrew their heads. Plainly noticeable on each side of the head was a uniform, rather wide circumorbital ring of white.

We did not further disturb the immature birds, but decided to confine our activities to recording such changes in them as might occur during the five days that would elapse before our return journey. We were at the moment content carefully to note the exact appearance of the nestlings' upper parts, arranging to take, later, snapshots of the nest, its contents and its neighborhood. The nesting tree was what is known to the natives as the "serebadanni", or sap tree, an account of which is given by the government forester, Hohenkerk, in Timehri, v, ser. 2, p. 114. It is a fine hardwood, its foliage suggesting one of our northern maples; and it attains a medium height of 50 feet. So far, it does not seem to have been systematically identified—like so many other South American trees.

On the return trip, five days later, we had no difficulty in locating the nest, but at first glance we thought, especially as we saw no trace of the parent birds, that the young had flown. On our shaking and pulling neighboring branches, however, two heads protruded above the margin of the apparently empty shelter. The trouble we had to induce the nestlings to show themselves argued that they had not only considerably developed in five days but that they had, perhaps, profited by parental instruction. The chicks had also acquired more gray feathers on the head and neck. The principal difference, noted by all the members of the party, was the fading of the previously well-marked white circle about each eye, a ring of color that had stood out less than a week before as the most striking part of the upper plumage.

As it was not practicable to do more than take a few photographs of the nest and young, I refer the reader to the accompanying illustration (fig. 58). Unfortunately, none of the six snapshots turned out, when developed a week or so later, as well as we hoped, a common experience in the tropics with films not promptly dealt with; but this one will serve to show the general characters of the tree and of the ibis nest.

Chicago, Illinois, March 10, 1923.

THE PHONETICS OF BIRD-SOUND

By RICHARD HUNT

THE following plan for a more standardized method of hearing and recording bird utterances is submitted in the belief that it is needed. In at least four fields—ecology, evolution, heredity, and animal behavior—bird vocalization has figured, and must in the future figure, as pertinent and important material. Investigators in these fields, however, are handicapped because there is no agreed-upon terminology for handling the facts of bird sound.

The common belief seems to be that bird sounds are essentially indescribable, and that therefore one man's attempt at description is as useful (or as useless) as another's. It should be remembered, however, that no science or branch of a science, has ever developed ahead of its terminology. A terminology and technique is built up by use, as new facts and concepts come to light. In so far as bird vocalization is concerned, our chief need is for ornithologists to start in talking about the facts of bird sound in an agreed-upon language. So far it has been "each man for himself."

Various systems have been offered,—musical, graphic, and literary. I can not take space here to discuss the relative merits of these systems. The plan herewith offered is based on phonetics. It is believed to be the natural and logical system for three chief reasons: (1) it is perfectly flexible, providing for the recognition of all factors in bird sound (pitch, intensity, rate of speed, form, expression, timbre, and phonetic quality); (2) the working symbols are those of the English language, and are therefore common property and do not require special knowledge or technique; (3) these symbols are essentially suited to the expression of bird sounds, since bird sounds are essentially human speech-like. As some exception has been taken to my claim that bird sounds are human speech-like, I feel that I should devote a little space to explanation, especially since I may previously have failed to make clear just what I mean by human speech-like.

I do *not* mean that birds talk or converse, impelled by motives or needs homologous to those governing human talk and conversation. I mean merely to say that the typical outward *effect* or *structure of a bird utterance*, aside from whatever inner meaning or function it may have, is *like* human talk, and *not* like human singing. I agree that birds *sing* (as well as utter notes of alarm, warning, etc.). Their singing may even have behind it emotional urges and needs similar to those behind human singing, but the physical sound-result is certainly different. Now, it is possible to say or pronounce words after a fashion by whistling them. For example try to whistle the word "doggie." In doing this you produce a bird-like sound effect— an effect which is typical of bird utterance. The quaint Barrington, author of perhaps the oldest treatise on bird-song in our language, remarked: "Thus also the linnet, which I heard repeat the words *pretty boy*, did not articulate like a *parrot* or a *mino*, though at the same time the words might be clearly distinguished." In Hudson I find the following quotation from Sir George Grove regarding the English blackbird: "He selects a spot . . . . and begins quite at leisure . . . . a regular conversation. 'And how are you? Isn't this a fine day? Let us have a nice talk', etc.,

etc. . . ." . "Strange as it may seem," says W. Ward Fowler, "the songs of birds may perhaps be more justly compared with the human voice when *speaking,* than with a musical instrument, or with the human voice when singing; and we can no more represent a bird's song in musical notation, than the inflections of Mr. Gladstone's voice when delivering one of his great speeches."

Sweeping statements are of course dangerous. Very occasionally a bird utterance is heard which can be accommodated without contortion on the musical staff. Even then, however, the phonetic or speech-like essence of the utterance itself remains unchanged: "pretty boy," for example, is to be *spelt* the same whether "sung like music" by the bird or "spoken." It is not as if syllabification and musical notation were mutually exclusive.

Bird utterances, whether songs or one-syllabled calls, have inflections, cadences, "tunes," or general fluctuations of pitch and emphasis, closely resembling these same phenomena in the speaking (and rarely the singing) human voice. Let the reader call to mind, for example, the Olive-sided Flycatcher's note, *Pui-peeee-veur!* If I were hunting for an adjective to describe the *expression* of this call I would decide on the word 'dauntless,' for it suggests the tone of voice in which a human being would say a three-syllabled word dauntlessly. There are times when, by accident, as in the case of Barrington's linnet, the 'words' that a bird whistles, chirps, or twitters, resembles human words, but what is more important, whether they resemble human words or not, they almost invariably resemble the *tone of voice* in which human words are or might be uttered.

It would logically follow from the fact that bird utterances are human speech-like that in making records of bird utterances the same symbols should be used as are used in the written human language. But one does not need to prove the thing by logic. Direct listening to bird sounds has proved to my entire satisfaction that a large number of more or less distinct phonetic effects are contained in the utterances of birds. These phonetic elements fall very nicely into four classes, which we may call: (1) *the vowel sounds,* (2) *the explosives,* (3) *the fricatives,* and (4) *the musicals.*

I. THE BIRD VOWEL SOUNDS

ee	as in meet	*a*	as in hat
ĭ	as in hit	*ä*	as in father
ĕ	as in pet	*aw*	as in saw
ŏ	as in hot		
ĕ	as in whirl		
ŭ (or uh)	as in hut		
ŏŏ	as in stood		
oo	as in who		

The vowels in the first column are arranged in descending scale; each falls within a definite and characteristic "region of maximum resonance" which determines its relative *pitch* value in the utterance. It is thus obvious that if we correctly determine the vowel sounds in a bird utterance and spell the utterance accordingly, we thereby automatically convey an idea of the relative pitch. The vowels from *ee* to *oo* are intrinsically clear, pure-toned, or tonal, and hence may be called *tonals* to distinguish them from the sounds in column two, which are intrinsically harsh, raucous, or nasal sound-

ing, and which we may call the *fricative vowel sounds. All* the above sounds are *continuables*—they may be indefinitely prolonged without change of character.

From these same vowels, however, are derived certain *non*-continuable effects, representing rapid transitions from one continuable vowel to another. They are thus virtually brief upward or downward glides of sound and may be called *the inflectives.* They are:

\ay	(=a+ee)	*eŭ*	(=ee+uh)	*ow*	(=a+oo)
oy	(=ŏ+ee)	*eu*	(=ee+oo)		
ooee	(=oo+ee)				

It should here be explained that *w* and *y* are, in bird utterance as in human, not actual sounds at all, but mere points of change or inflection. To secure life-like effects it is often necessary to use *w* and *y* in recording bird utterances, but it should be remembered that *w* represents the low sound *oo,* and *y* represents the high sound *ee;* thus:

Twee is in actuality t + oo + ee
Tyou is in actuality t + ee + oo

II. THE BIRD EXPLOSIVES

wh	*p* (*b*)
t (*d*)	*k* (*g*)
ch (*j*)	(*th*)

We are very much in need of some adjectives or descriptive words answering to the explosives. One service that interested ornithologists may render is to correlate phonetic bird sounds with descriptive words, thus gradually contributing to a basis for a more standardized terminology. If by comparing the field notes of say a dozen men it should be found that seven or eight had described notes as 'chipping' in which a *ch* element was discovered, we would have some reason for standardizing the word 'chipping' as signifying a note to be spelt with a *ch.* As a matter of fact, however, 'chipping' could not apply to all *ch*-notes since many such notes take low-frequency vowels and might more properly be called 'chupping' or 'chocking' notes, etc. The trouble here is that an explosive is not so apt to determine the whole utterance as is a vowel or a fricative, for the explosive is ordinarily merely a more or less obscure *initial* effect. The initial, however, can be very marked, and have a decided character of its own. There is no doubt that we shall have to 'coin' a certain number of descriptive words, whether on a phonetic basis or otherwise.

The bird explosives are (with the exception of *th*) strictly *non-continuable.* They may be thought of as brief flashes of sound in the whole utterance; each has its peculiar 'brilliancy' and 'color.' To use another figure, each lends a special 'flavor' to the sound of which it is a part. Much space could be given to a qualitative analysis of the properties of the explosive sounds. Briefly, *wh* is *breath-like; t* is *hard* and *sharp* and *tight* and *incisive; ch* is hard, yet comparatively *slow* and *loose-sounding; p* is *weaker* than *t,* is often the initial in continued sounds of a *peeping* or *piping* character, and shows a marked tendency to combine with musical *l* in the formation of *musical* explosives; *k* is hard *like t* but *not* incisive; it is *deader* (except when livened by the admixture of a musical *l* sound); it is always found in cracking, creaking, and croaking sounds in combination with non-musical *r;*

th is really a fricative, but often plays the rôle of an explosive, lending to those sounds of which it is the initial element a certain impact-like *thippiness* or even a *lisping* quality. The sounds *d*, *j*, and *b* are obscure phases of *t*, *ch*, and *p*. The *guttural* sound *g* is not uncommon in bird utterance, and is often associated with musical *l*, as in the song of the Brewer Blackbird and the cowbird.

III. THE BIRD FRICATIVES

wheezy	*hw*	———?	*zh*
sputtery	? *f* (*v*)	German	*ch*
sibilant	*s*	nasal	*m*
shuffly	*sh*	nasal	*n*
buzzy	*z*		

When a fricative exists at all it usually dominates and runs throughout the utterance as a more or less specific sort of effect. It is therefore not hard to give most of the fricative sounds specific names. Nominations are in order for *zh*, however; and I am not convinced that 'sputtery' is the final designation for sounds containing *f*.

The fricatives are, like the vowels, *continuable* (though they may be abbreviated so as to serve as initial or final effects). A fricative, like an explosive, always *accompanies* or emanates from a vowel sound, of which it may be said to be the *irradiation*. In this phenomenon is contained a valuable hint for the field recorder of bird utterances, who so often finds a note 'unspellable.' It will often be found, on careful listening, that the difficulty arises from the fact that two sound elements (i. e., a vowel and a fricative) are synchronous. The elements should be separated out by ear one by one, and the spelling built up on the page of the note book. The vowel-sound or sounds of an utterance can almost always be picked out before anything else can. If a fricative is next discovered, it should be *superposed* over the vowel sound in the finished spelling. Thus the song of the Western Wood Pewee should be spelt:

zzzzzzzzz
Bceeeeeeeee

The peculiar character of each bird fricative may be realized by an experimental use of the human mouth. *Hw* and *f* are the weakest and most obscure of the fricatives; *z* and *ch* are the strongest and the most readily recognized. A rough sound emanating from a vowel effect may always be recognized as a fricative, even though its specific character is not immediately apparent. Even as a foreign bird skin sent to one for identification might be placed in its proper genus, but not immediately in its specific niche, so can one usually recognize a *general* fricative element in a bird utterance, though one may not be able immediately to identify it as a buzz or a wheeze. If it cannot be written *ch ch ch ch* / *whaaaaaaaaa*, it can at least be written *fricative* / *whaaaaaaaaa*. It may be that there are some important undiscovered bird fricatives. Theoretically *th* is a fricative, but I have never discerned it as such in bird sound.

IV. THE BIRD MUSICALS

musical *l* musical *r*

L is the most musical of the bird sound elements. It occurs in sounds of both whistle-like and impact-like character. It shows a marked affinity

for *p* and *k*, with which it combines to form some of the most pleasing bird sounds.

Strictly speaking, we must recognize two *r*-sounds: (1) *musical r*, which is, like *l*, a *fluent, gliding* or perhaps briefly rolled or looped *inflection* or connective; and (2) *rolling r*, which is not necessarily musical, and which is the *apparent* sound effect emanating from certain rapidly-repeated impact-like sounds—as a regularly repeated series of 'metallic' *t*-sounds seems to become *trrrrrrrrr*. *R* is often one of the chief determining factors in *rich-harsh* or *rich-croaky* sounds, such as *kraa* and *kruh*.

The main purpose of this paper is to enlist the coöperation of interested ornithologists in standardizing the terminology and technique of the science of bird sound. It seemed to me that a good way to begin was to offer the above suggestions as a possible working basis. Needless to say the writer will be glad of criticism and suggestion. One much needed thing is the fixation of more definite word meanings through the common specific use of descriptive words referring to facts of bird sound. A Dictionary of Bird Sounds can be built up by cooperative action, and the words should eventually be classified not only in accordance with their reference to the four classes of phonetic bird sound, but also with reference to the factors of pitch, intensity, speed, form, expression, and timbre. For example, 'shrill' refers to *pitch;* 'loud,' to *intensity;* 'rapid,' to *speed;* 'staccato,' to *form;* 'querulous' to *expression;* and 'rich' to *timbre*. As a working basis of possible value to others in their bird utterance work, I submit the following alphabetically arranged, incomplete list of

BIRD SOUND DESIGNATIONS

abrupt	blare	crunching	chug	clump
alarm	belling	crowing	clear	crumple
alto	blast	crow-like	clarity	clarinet
attenuated	bursting	cicada-like	choppy	crake
asthmatic	bombinate	cuckoo-like	croupy	
aspirate	bark	canary-like	crack-voiced	drum
	brawl	chitter	coarse	drone
base	bay	chatter	cooing	dead-sounding
blown	blatter	chutter	cackle	dripping
beaten	babel	clatter	chink	dry
bounding	blab	clap	chat	discordant
banjo-like	babble	clip	call	drawl
blackbird-like	brassy	crackle	clamor	detonate
bellow	blurting	clang	caterwaul	ding-dong
buzz	bumping	clank	cat-like	dulcet
bantam-like	baa	clink	crashing	devil's tattoo
bell-like	blithe	click	crepitate	dove-like
bow-wow		cough	clutter	dog-like
breathless	chant	chip	charivari	ditty
breathy	castanet-like	chipper	clack	double-toned
bang	crinkling	chirp	chime	
blubber	crick	chirrup	contralto	effervescing
burred	creak	cheep	cry	explosive
bleat	crack	chuck	chuckle	echoing
bray	croak	chack	chickadee-like	
bawl	cricket-like	cluck	carol	flowing
bugle	crink	churr	chortle	fizzy
boom	crisp	clash	chiff	fluent

flutey
feeping
frog-like
forced
fluffy
flutter
fricative
falsetto
flapping
flopping
flipping
flaring
fife-like
filing
fizzling
fulminate
flump
feminine
finchy

grinding
grating
growl
gasp
glassy
grasshopper-like
gliding
gurgle
glug
gulp
gargle
guttural
gritty
gabble
gobble
grunt
giggle
gibber
gruff
grum
groan
gaggle
gushing
gong-like

honk
hoot
howl
harsh
hoarse
hawking
hiss
heavy
hollow
human-like
hum
husky
half-human

hard
hiccup
high
halloo
hoop
hen-like
hammering
horn-like

instrumental
impact-like
insect-like
incisive
iterated
inflected
intoned

jingle
jangle
jabber
jibber
jar

kissing
knocking
kitten-like
katydid-like

lapping
loose
lispy
lippy
lispering
light
laughing
long-drawn
lowing
little-voiced
liquid
licking
lusty
latration
locust-like
leathery
lay
lyric
lilt
lively
legato
loud

maniacal
moo
meow
mew
musical
metallic
mellow

melodious
masculine
murmur
moan
mewl
mouse-like
mutter
muffled

nasal
noisy
neigh
near-whistle
nipping

outright
oozy
oboe-like
out-of-breath
owl-like
open-mouthed
oriole-like

pop
pip
peep
pipe
puff
patter
pat
plop
purr
prattle
planning
protracted
plash
pebble-tapping
pealing
piercing
pitapat
pule
pig-like
parrot-like
puppy-like
played
purling
pulsating
palpitating
ponderous
puttering
pitch-pipe
plaintive
penetrating

quivering
quavering
quick
quack

quawk

rumble
roll
roar
ripple
rustle
rattle
rip
rickety
rich
rich-harsh
rending
rubbing
rasping
ringing
resonant
round
rough
reedy
rushing
raucous
reverberant
rapping
report
rataplan
ratatat
repetition
rooster-like
reeling
rollicking

say
speak
shout

scrape
strident
split
squash
squeeze
sip
snicker
sigh
sough
snuffle
sniff
screech
scream
shiver
shimmer
snort
sibilant
shuffle
soft
stomachy
sweet
shriek

snore
short
smooth
sonant
sizzle
snap
sneeze
snarl
shattering
sputter
spatter
spit
spat
smack
striking
strained
synchronous
squawk
stir
sharp
squeal
stacatto
sonorous
snuff
sing
shake
song
sing-song
squall
stage-whisper
swish
shrill
stentorian
slam
soprano
screak
squeak
silvery
strain
stone-tapping
sound
strum
snip
splash
stutter
sawing
sparrowy
sotto voce
slur

tap
toot
trill
tinkle
tear
tremulous
thippy
tonal

twang
throaty
tinny
tipping
tipper
tsipper
tseep
thin
tenuous
tick
thick
troll
tight
trumpet-like
twitter
tweet
trickling
tang
tink

thumping
thudding
thundering
tattoo
tantara
tolling
tintinnabulation
treble
tenor
tune
thrum
tymbal
throb
tattle
thrushy
tree-cricket-like
talk

ululation

undulating
utterance
un-musical
un-ringing
un-resonant
uncanny

voice-like
vocal
vibratory
voluble
ventriloquial
vociferation
violent
velvety

whine
wail
wheeze

whistle
whisper
warble
woodeny
wet
wiry
watery
wrenching
whinny
whimper
whizz
whir
whoop
wrinkle
weak
whipping
whirling
whetting
wind-bell-like

wierd
warblery

xylophone-like

yowl
yawn
yap
yip
yell
yodle
yawp
yelp

zizzy
zip
zing

Palo Alto, California, June 16, 1923.

A STUDY OF SOME PLUMAGES OF THE BLACK TERN

(WITH TWO PHOTOS)

By A. J. VAN ROSSEM

AMONG the specimens collected for Donald R. Dickey by the writer during the summers of 1920 and 1921, at Buena Vista Lake, Kern County, California, was a small series of Black Tern (*Chlidonias nigra surinamensis*). These were obtained on various dates ranging from May to September, and were taken more or less in the way of routine collecting, with the object of outlining roughly the post-nuptial molt,—the change from dark summer to light winter dress. When this series was assembled it became evident that there were many misfits,—in other words, plumages which refused to accommodate themselves to an orderly sequence. In 1922 and 1923, therefore, a special effort was made to work out some of the problems for which the small series previously collected offered no solution. In addition to this personally taken material, use has been made of specimens in the Museum of Vertebrate Zoology. My thanks are due also to Dr. L. B. Bishop, for many helpful hints and suggestions.

The nesting and downy young of this species are so well known that any space devoted to them would be a rather useless repetition of other accounts. However, one item about egg laying may well be emphasized because it has an indirect bearing on the subject which this paper is intended to cover, namely certain phases of plumages and molts. The writer is confessedly ignorant of what has been done in recent years in the study of molt-causation, but, as the following observation has been of interest to others to whom it has been men-

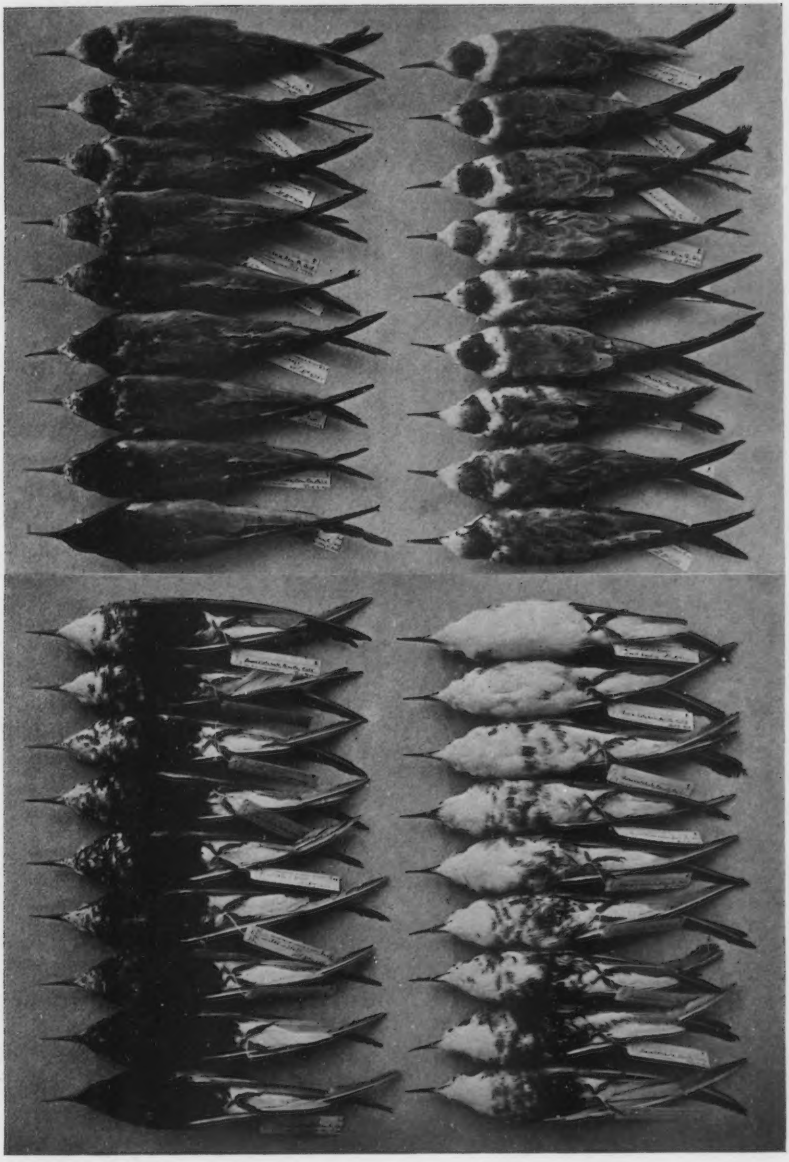

Fig. 59. THE FALL MOLT OF THE ADULT BLACK TERN; ARRANGED FROM BOTTOM TO TOP, IN TWO ROWS, VENTRALLY AND DORSALLY.

tioned, it is hereby offered as of possible value. It is almost axiomatic that breeding and molting follow a more or less regular sequence; that molting in the natural course of events follows breeding, and an inter-relation between the two is naturally to be inferred. Therefore, it was rather surprising to see these Black Terns, whose nests were destroyed again and again by wind storms, continue to lay until they were in some cases halfway through the "post-breeding" molt. In this instance, then, at least, we have a case in which

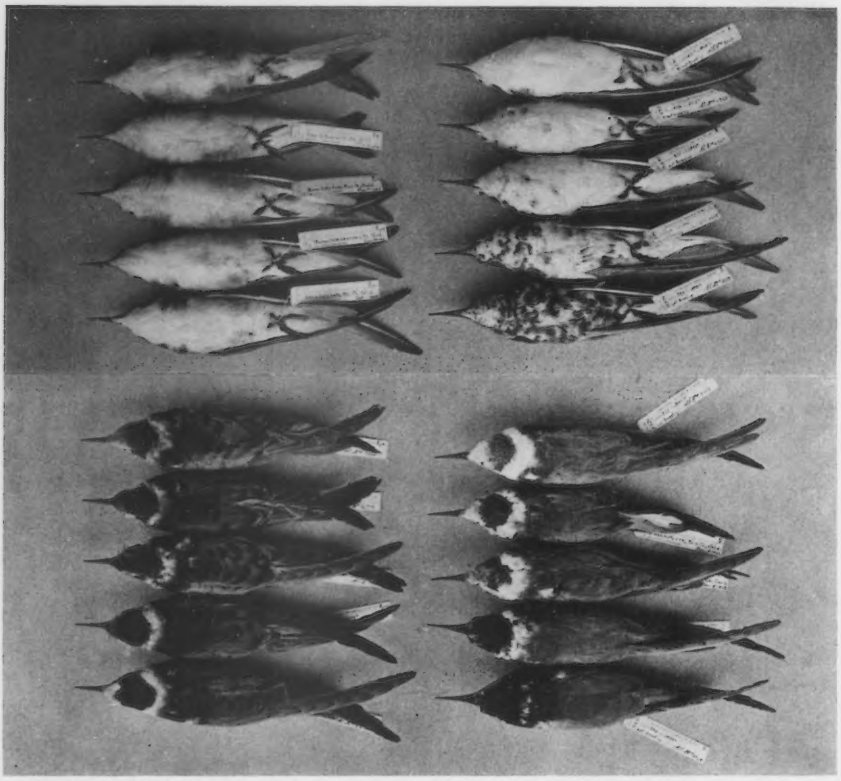

Fig. 60. Left-hand row: SELECTED JUVENILES SHOWING CHANGE THROUGH WEAR; YOUNGEST AT TOP, OLDEST AT BOTTOM. Right hand row. SELECTED VARIATIONS OF FIRST SPRING PLUMAGE.

molting and laying were occurring at the same time, with neither function suppressing the other.

Juvenal and First Winter Plumage.—The completely feathered juvenile, from which the last trace of down has been shed, in general resembles the winter adult, from which it differs as follows: darker throughout, with a brownish wash over the whole plumage (most pronounced on the dorsal surface and least noticeable on the central underparts); flanks and sides more

extensively grayish; remiges and rectrices with narrow edgings of pale gray on tips and along inner edges. These edges soon disappear and the brown fades and is abraded from the contour plumage. The forehead, underparts, and hind neck become almost as white as are those parts in the adults. The crown becomes blacker—sometimes sooty black—and therefore much darker than in old birds where the black is confined to the auricular and preocular regions. The back, wings, and tail remain very dark, and on the first named section a good deal of brown tipping remains. The only new feathers which are acquired before the last birds leave, the first week in October, are a few white ones on the underparts. Careful examination of specimens at the time of preparation showed this to be the only change which takes place in the juvenal plumage between July 1 and October 1, with the exception of the abrasion and fade noted above.

First Spring Plumage.—This is a highly variable stage and is the intermediate step toward the adult plumage. Some individuals are superficially much like winter adults, and from this light extreme they range to a mixed black and white plumage in which the black is predominant, and the mantle color closely approaches the shade seen in summer adults. The piebald type bears a rather close resemblance to some stages of the molting summer adult, but from an entirely different cause in that the variegated molting adult has black feathers mixed with white feathers, while the younger bird is white, with a variable amount of black tipping. It is this variability in the matter of black tipping that causes the wide range of marking in birds of this age. There is seemingly no trace of any wholly black feathers, although there are a great many pure white ones. This plumage is the first change from the juvenal stage of the previous late fall. It results from a renewal of the entire juvenal plumage, including tail and flight feathers, except for some of the wing coverts and some scattered body feathers. Probably the body molt takes place on the average a little earlier than the spring molt of the adult, for some wear is noticeable by June 1, while adults at this date are still in comparatively fresh and unabraded plumage. Occasional one-year-old examples taken as late as the first week in June retain one or two old juvenal primaries, but this is not extraordinary, considering that at this age they go through a complete wing molt, whereas the adults almost never renew all of the primaries, and never all of the secondaries at this season. The last juvenal (outermost) primary is shed near the first of June, and almost immediately the change into the second winter plumage begins.

Representatives of this age (first spring) are very much in the minority. The proportion to adults is not more than about one to fifty, and one is immediately tempted to conclude that a great many individuals attain the black plumage in the first year. Were it not for the fact that careful search fails to reveal a single black bird whose unreplaced secondaries and primaries are other than those of second or third winter plumage, or one which shows even a single juvenal feather, I should be apt to think this possible. In other words, such flight feathers of the previous fall as remain in black birds emphatically are not juvenal feathers; therefore all black birds examined were at least two years old. The strong probability is that the majority of one-year-olds do not come north in the spring, but remain in winter quarters until the birds reach maturity, at two years of age. It may be remarked that in all of the one-year-

olds taken, there was noticeable a slight enlargement of the sexual organs, and in two cases—one white and one piebald—they were breeding. Such conditions are present probably in only the most vigorous birds, and—slight as they usually are—act as a sufficient urge to send them on the northward spring journey, whether (rarely) or not (usually) they actually breed upon arrival. In this connection, it may be stated that young birds do not arrive until about June 1, six weeks after the adults.

Second Winter Plumage.—Now takes place a renewal of every feather on the body—the first complete change since the step from downy to juvenal, for some of the wing coverts and a few contour feathers have remained over from the juvenal stage. For the second time (sometimes starting before the last juvenal primary has been shed) all of the primaries are replaced. This plumage is identical with that of the winter adult; the change begins about a month earlier, however, and the new plumage is taken on a little more slowly, for it is completed at the same time as is that of the adult. The primary molt starts simultaneously with the body molt, even before the last juvenal primary has been replaced, about June 1; whereas in adults the primary molt does not start until the body molt is well under way.

Second Spring or First True Pre-nuptial Plumage.—This change results in the well-known black plumage from which the species gets its name, and in which it is most commonly known. It is a complete renewal of the entire body plumage, the tail, sometimes as many as 5 (usually 2 or 3) of the outer secondaries, and very rarely all of the primaries,—usually the inner 4, 5, or 6. It is evidently completed just previous to the northward migration, for up until the last of May, one occasionally finds a few old white feathers on the lower breast and upper belly which still remain unshed. On the other hand, I have seen a fully plumaged black specimen taken as early as April 12. The manner in which the black body is attained is unknown to me, for the birds do not arrive until it is complete or practically so. As with all plumages of this tern, the summer dress is a rather temporary one, and in its complete state is worn for an average of little more than two months. In fact, it might be said that more than half of the Black Tern's life is spent in molting. About July 1, there appear many birds which have 'pepper and salt' faces, the first outward evidence that they are commencing the fall molt.

Adult Fall Molt.—This molt occurs by no means simultaneously in all individuals. Birds with speckled faces are to be found as early as the middle of June, and again a very few retain the full black plumage until the first of August. The dates given here are believed to be average for the mass, and they will serve for most of the birds encountered in California.

Beginning on the loral region, forehead, and chin (about July 1), the entire head, neck, and upper breast are molted comparatively rapidly and these parts are with the exception of occasional feathers pretty well whitened by the middle of the month. Then there is a lull of somewhere near ten days, during which time most of the few remaining black feathers about the fore parts are shed. It is during this slowing up in the shedding of the body plumage that the primary molt begins, and it is not unreasonable to suppose that the check is due to diversion of a part of the feather-building fluids to the wings. On resumption of the body molt the last week in July, the upper and under tail coverts are shed, the tail molt begins, the white starts to creep down the breast,

and the pale gray of the mantle commences to appear on the back. Thus at this stage, the molt is progressing slowly backwards from the upper breast and hind neck, and rather more rapidly forward from the tail coverts. This is a slow process, and it is not until the first week, or even the middle, of September that the black feathers disappear from the area of the lower breast on the underparts and from the center of the back on the upperparts. About two and one-half months are therefore required for the completion of the body molt,—an extraordinarily long time, judged by ordinary standards.

The Fall Wing Molt.—The carpal joint is the center from which the wing molt commences. It begins in adults about July 15, with the dropping of the first (inner) primary, or at the time when the head and neck molt is practically complete. In the one-year-olds, it commences earlier— about June 1 to 10—as soon as, or even before, the last juvenal primary has been replaced. The primaries are dropped in regular order, each as its inner neighbor reaches full growth. The molt of all the primaries requires somewhere near three months, for when the last birds leave, about October 1, they depart with between two (usually) and four (rarely) primaries still unshed. There is a very close relation between the primaries and their coverts, for each covert is dropped and the new one grown in company with its own primary, and not before.

The secondary molt starts at the carpal joint when the second or third primary is fully grown, and progresses inward. The change is fairly rapid, for the secondaries are finished by October 1. As with the primaries, each succeeding quill is shed when its neighbor has reached full growth. There is no close relation between the secondaries and their coverts. The secondary coverts are shed all at once, at the dropping of the third or fourth secondary. The rest of the coverts and the contour feathers of the wings, are acquired gradually with the body plumage. The direction is from the larger coverts toward the bend of the wing, the lesser coverts being the last replaced, toward the finish of the body molt. The scapulars and tertials are shed comparatively early, and in conjunction with the adjacent body plumage.

Fall Tail Molt.—This molt begins between the dropping of the third and fifth primaries, or just after the secondary molt is under way. There is no ironclad sequence such as holds with the wing feathers, and no very definite rule can be laid down. Numbering the pairs from the inside, the center pair number one, and the outer pair number six, either the first or the second pair is shed first, following these the third, but occasionally the sixth, is dropped (in either case the other pair soon follows); after these come the fourth, and invariably the fifth or next to outer pair is the last to be shed. The duration of the tail molt is comparatively short. The feathers grow rapidly, and even though they must usually (not always) reach full length before the succeeding pair drops, the entire molt does not consume more than five or six weeks.

While the average adult tail possesses a deeper fork and narrower feathers than that of the juvenile or one-year-old, there is so much individual variation in this respect, regardless of age, sex, or season, that to attempt an age diagnosis on such characters would not be possible in all cases.

Summary.—Two years are necessary to attain the black plumage of maturity and during that time the individual passes through four preliminary plumages. These are

(1) Natal or Downy
(2) Juvenal
(3) First Spring
(4) Second Winter
(5) Second Spring

Pasadena, California, June 2, 1923.

THE SYSTEMATIC STATUS OF SOME NORTHWESTERN SONG SPARROWS

(WITH MAP)

By HARRY S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California.)

THE present paper is the result of an attempt to outline the ranges in British Columbia of the races of *Melospiza melodia* that inhabit the province, this for a distributional list of the birds of British Columbia now in course of preparation by Major Allan Brooks and myself.

The greater part of the material upon which the study is based is contained in the Museum of Vertebrate Zoology, but the following specimens were borrowed from other institutions: from the Victoria Memorial Museum, Ottawa, an extensive series of song sparrows representing many localities in British Columbia; from the United States National Museum, a series of birds representing *Melospiza melodia inexspectata*, including the type of that subspecies; from the United States Biological Survey, a series of birds from the Queen Charlotte Islands; from the Museum of Comparative Zoology, Cambridge, Massachusetts, the type specimen of *Melospiza fasciata merrilli* Brewster. For the use of all this material, indispensable to such a study as this, my thanks are extended to each of the institutions concerned and to the individual curators through whom the loans were made.

I am also under a debt of gratitude to Major Allan Brooks for criticism and aid of various sorts. His assistance was sufficient to justify the appearance of his name as co-author of this paper had he not wished otherwise.

Although it is the song sparrow of British Columbia that is of first concern here, the status of the bird of southeastern Alaska (the Alexander Archipelago and the adjacent mainland) is so much a part of the same problem that that region is necessarily included. For convenience the term '*rufina* group' will be used to designate the birds here treated, the reddish brown song sparrows of the coast of northwest America from central Oregon north to Glacier Bay, and, in British Columbia, west from the Rocky Mountains. To the birds of that general area the subspecific names *rufina*, *guttata*, *morphna*, *merrilli*, *montana*, *inexspectata*, and *phaea*, have been variously applied.

My own first impression was that the song sparrows of the entire region might well all be listed under one name. I had several times studied series of specimens from southeastern Alaska and from different parts of British Columbia without being able to correlate definite subspecific characters with particular regions, and at first it did not seem to me that such correlations could be established. Inasmuch, however, as certain extremes of variation are represented by birds from localities as near together as the Queen Charlotte Islands and Vancouver Island, and as these extremes are different enough to be recognizable in the living bird, it is apparent that at least two subspecies of *Melospiza melodia* will have to be conceded. It then remains to bring the rest

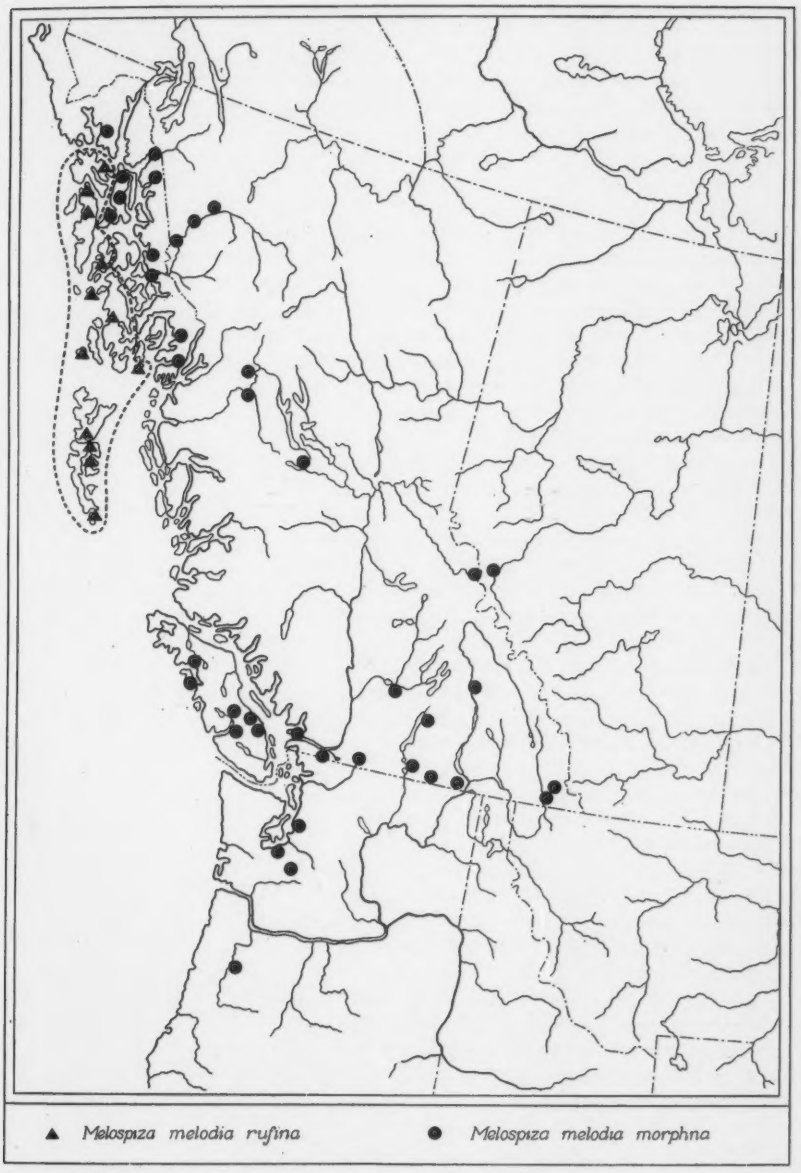

Fig. 61. MAP OF A PORTION OF NORTHWESTERN NORTH AMERICA, SHOWING BREEDING RANGE OF *Melospiza melodia rufina* AND *M. m. morphna*. SYMBOLS INDICATE LOCALITIES FROM WHICH SPECIMENS WERE EXAMINED.

of the series into harmony with the division indicated between the birds from these two island localities, a task of some difficulty, for it means attempting to indicate by definite names and definite geographic boundaries average differences that do not lend themselves to hard and fast diagnoses. It is hoped, however, that the division here indicated, in accord with the facts illustrated in an extensive series of specimens, will be satisfactory as a rather gross separation of races. For any minute and detailed study of geographic variation in *Melospiza melodia* in this general region, I do not believe that our system of nomenclature can be used to advantage. That is, I do not think that it is practicable to give names to any divisions smaller than are here indicated.

Comparing the extremes mentioned, from the Queen Charlotte Islands and from Vancouver Island, the outstanding characters of the birds from the Queen Charlotte Islands are large size, long bill, and dark coloration; from Vancouver Island, smaller size, rather stubby bill, and bright reddish color. Other birds with characters the same as those of the specimens from the Queen Charlotte Islands were found from the westernmost islands of the Alexander Archipelago, Alaska, including two adults from Sitka, the type locality of *Emberiza rufina* Brandt. Also, specimens closely similar to Vancouver Island skins were found from the eastern islands of the Alexander Archipelago and from the adjoining mainland. So, making due allowance for variation in each series, a fairly satisfactory division of races could be made, as is indicated in the accompanying map (fig. 61.)

Birds from Chichagof, Baranof, and the Queen Charlotte Islands are alike and are here taken to represent *rufina* in the extreme manifestation of that race. Specimens from Kuiu, Prince of Wales, Warren, and Forrester islands are intermediate in character, between *rufina* and *morphna*. Two specimens from Duke Island are distinctly like *rufina*. The apparent anomaly in distribution in this last-mentioned case (see map) assumes added interest in view of the fact that a white-footed mouse (*Peromuscus*) is similarly isolated on Duke Island, the species found there (*P. sitkensis*) being the same as the one that occurs on the distant Baranof and Chichagof islands.

As regards names for the two subspecies of song sparrow here recognized, the following appear to be applicable. To the song sparrow of the western islands of the Alexander Archipelago, Alaska (Chichagof, Baranof, Kuiu, Prince of Wales, Dall, Duke, and adjacent small islands), and the Queen Charlotte Islands, British Columbia, the name *Melospiza melodia rufina* (Bonaparte) will apply. This name dates from: [*Passerella*] *rufina* Bonaparte, Consp. Av., 1, July 15, 1850, 477 (Sitka, Alaska; ex "*Emberiza rufina* Brandt, Desc. Av. Rossic, 1836, tab. ii, 5"). (Citation copied from Ridgway, U. S. Nat. Mus., Bull. 50, part 1, 1901, p. 374.)

Melospiza melodia morphna Oberholser (Auk, xvi, April, 1899, p. 183), substitute subspecific name for *guttata*, preoccupied, type locality near mouth of Columbia River, will apply to the song sparrow of the eastern islands of the Alexander Archipelago (Admiralty, Wrangell, Revillagigedo, etc.) and the adjacent mainland coast from Glacier Bay southward, over most of the mainland of British Columbia (except the extreme northern and northeastern sections), and Vancouver Island, and south at least to central Oregon.

This arrangement of the song sparrows of the section of the northwest coast under consideration is in a sense a recession from my attitude in previous

papers, for I have always regarded birds from all sections studied as *Melospiza m. rufina.* (See Univ. Calif. Publ. Zool., x, 1912, p. 60; ibid., xxiv, 1922, p. 255.) I did recognize certain differences between specimens in the Alaskan series, differences which are here correlated with the names *rufina* and *morphna,* but heretofore I have not been able to associate these characters with definite regions. It is the series from the Queen Charlotte Islands that proves the decisive factor. On those islands, apparently, the characters of *rufina* reach their extreme development, and with less variation between individuals than is seen elsewhere, where the range of *morphna* is approached.

In the *rufina* group, a feature that is at once apparent on examination of the large series now available is the surprising amount of individual variation in series from almost any section that is fairly well represented; and also the unexpected sort of variation that may crop up anywhere, as exemplified by certain skins from scattered localities.

As will be seen from the list of specimens appended, the material assembled includes extensive series from many places. It is the sort of variation that is exhibited in certain of these series that made me formerly unwilling to recognize two races, *rufina* and *morphna,* from the coastal region, north and south. Following are brief comments upon certain of the larger and more important series here considered.

Breeding birds from Vancouver Island are rather more uniform in appearance than Alaskan specimens, and generally they are brighter colored, more ruddy, than are the latter. Even in the Vancouver Island series, though, there are specimens, taken at the same place and the same time, that are markedly different in appearance. Together with the usual type of bird, with ruddy coloration and rather soft, blended markings, there is a considerable mixture of others, some darker, others more grayish, and some more heavily streaked above and below. A breeding bird from Alberni (Mus. Vert. Zool., no. 16199, adult female) can be closely matched in a series of the distant *cleonensis,* from the coast of northern California. A series from Nootka Sound is notable in the matter of bill development. In these birds the bill is long and slender, closely similar in shape to the bill of *rufina.*

In a series of seven birds, immatures in first winter plumage, taken near the mouth of the Taku River, Alaska, September 7 to 16, 1909, there is as much color variation as between Alaskan and Vancouver Island specimens. Some of the Taku River skins may be matched very closely by comparable specimens from Vancouver Island. Seven immatures and adults in fresh winter plumage taken on Sergief Island, Alaska, August 18 to September 4, 1919, are about like the Taku River birds, and show the same sort of variation.

Eight breeding adults from the upper Stikine River, British Columbia, taken June 9 to July 17, 1919, show a surprising amount of variation, in relative redness or grayness of general coloration and in the amount of red or of black in the streaking on the breast and on the back. Among six breeding adults from Hazelton, British Columbia, taken in May and June, 1921, there are extremes of redness and grayness as far apart as those distinguishing the average red-colored *morphna* of Puget Sound from the gray-colored *merrilli* of the interior. Fall plumaged birds from the same place show similar, though not as great, variation.

A series of eleven breeding birds (coll. Victoria Memorial Museum)

from Osoyoos Lake, Okanagan Valley, taken May 6, 10, 11, 15, 16 (1922), is of exceptional interest from the standpoint of the variation exhibited. Here, from the same spot, are breeding birds exhibiting dark coloration exactly like Alaskan specimens of *morphna*, others with the ruddy color of *morphna* as seen on Vancouver Island, and still others, gray of color and with sparsely streaked breast, that closely approach *merrilli*.

There is a single bird at hand (no. 9693, Mus. Vert. Zool., adult female), collected at the head of Marten Arm, Boca de Quadra, Alaska, June 10, 1909. This specimen, taken in a region where extremely dark-colored song sparrows are the rule, exhibits the extreme of gray coloration that can be seen in *morphna* from any part of its range. It matches exactly three specimens (nos. 3168, 2791, 2773, Victoria Memorial Mus.) from Midway and Trail, in extreme southeastern British Columbia. These three have been labeled *merrilli*, and, indeed, in appearance they and the Boca de Quadra skin approach very closely to that subspecies.

I have examined the type specimen of *Melospiza melodia inexspectata* Riley (Proc. Biol. Soc. Wash., XXI, 1911, p. 234), together with several other specimens from the general region of the type locality and I cannot regard that subspecies as worthy of recognition. It is indistinguishable from *morphna*. Oberholser (Auk, xxxv, 1918, p. 187), urging the validity of the race, says: "It is most nearly allied to *Melospiza melodia rufina*, but is decidedly smaller, particularly in so far as the bill and wing are concerned; and is, in fact, a smaller, darker, somewhat heavily streaked edition of that bird."

As regards color and markings, specimens of "*inexspectata*" can be duplicated from the Alaskan coast. Furthermore, individual variation in the *rufina* group is so extensive, as I have shown, that it is not practicable to make the division indicated. As regards measurements, the appended table shows the similarity of "*inexspectata*" of the interior and *morphna* of the coast.

In British Columbia there remains to be considered the status of *Melospiza melodia merrilli* Brewster. I cannot find that this name has been published as pertaining to a British Columbia bird, but I have examined specimens in the Victoria Memorial Museum that were so labeled by different authorities. These are apparently some of the same birds listed by Macoun and Macoun (Catalogue of Canadian Birds, 1909, p. 540) as *Melospiza cinerea montana*, taken at various points in southeastern British Columbia. Specimens from that section, from Midway, Trail, and Fernie, for example, do certainly approach *merrilli* pretty closely, though I have seen none that are as gray as the type of that subspecies. I have no grounds for discrediting the validity of *merrilli* as occurring elsewhere, but it is not practicable on the basis of these variable specimens to give the race formal standing in a list of the birds of British Columbia, with any definitely outlined range in that province.

There are at hand seven specimens (including the type) of the type series of *Melospiza cinerea phaea* Fisher (Condor, IV, 1902, p. 36) from the coast of southern Oregon. These birds average of small size, but all things considered, I do not regard them as representing a recognizable subspecies. Such variation from the mode of *morphna* as is seen, both in color and measurements, appears to me to be in the nature of intergradation toward *cleonensis*, the adjoining subspecies to the southward.

The one outstanding fact brought out by an adequate series of specimens of the *rufina* group is the relative uniformity of characters presented over a tremendous area; and this despite the fact that there is a wide range of variation among birds from any one locality, for the same sort of variation crops up almost everywhere. This uniformity in the British Columbian and southeastern Alaskan song sparrow is in marked contrast to the manner in which the species breaks up into local races to the northward and to the southward. To the north are the several more grayish-colored Alaskan races, exhibiting well-defined characters of color and structure, and each occupying a definite and relatively circumscribed habitat. To the southward, *Melospiza melodia* again breaks up into rather sharply defined races, mostly of limited distribution.

To some it may seem that the proper procedure in handling the *rufina* group would be to recognize four subspecies where I have defined two. These, centering about extremes that are admittedly appreciable, would be (1) the ruddy bird (*morphna*) of Vancouver Island and the adjacent mainland; (2) the grayish-toned *merrilli* extending into southeastern British Columbia; (3) a darker-colored race (*inexspectata*) from the northern mainland and part of the Sitkan district, Alaska; (4) a larger, dark-colored race (*rufina*), with range as previously outlined in this paper.

These, however, certainly are not definable races in the same sense as *caurina*, *kenaiensis*, or *sanaka*, to the northward, or *cleonensis*, *samuelis*, *pusillula*, and others to the southward. Their characters are hard to define, and, as previously shown, individual variation in nearly all sections is so great that there would be a large proportion of specimens in any series that could not be subspecifically allocated on any ground but the geographic situation of the place of capture.

It may be said that *caurina* and the related gray-colored subspecies to the northward, the blackish California subspecies to the southward, and what might be termed the *melodia* group to the southeastward, each represents a section of the species comparable to what I have here called the *rufina* group. Within each of the three first mentioned divisions, local differentiation has proceeded to a point where several races, more or less sharply defined and of restricted range, can readily be recognized. In the *rufina* group we can see a strong tendency toward such subdivision, but, save between the very extremes, it has not advanced far enough to permit of ready definition of characters in the birds from different parts of the general range.

It seems to me that in any study of a variable bird like *Melospiza melodia*, stress should first be laid upon the major divisions of the species. In the present case this would be on the reddish-colored *rufina* group in its entirety, as compared with the group formed by the gray-colored Alaskan races occurring abruptly to the northward, the brownish-colored *melodia* group (connected through *merrilli*) to the southeastward, and the blackish-colored California subspecies (connected through *phaea*) to the southward. It seems to me that it would be well to regard observed differences within each of these larger divisions in a somewhat different light from those by which these same divisions are separated from each other.

In the mechanical handling of names, in our efforts to convey observed facts, it seems to me that we are making a mistake when, for example, we publish lists of names as the song sparrow names appear in our *Check-List*

of North American Birds. To scatter closely connected, sometimes scarcely distinguishable forms, among others most remotely related, is to obscure the facts. All recognizable subspecies are not equidistant from one another, and they should not be treated as if they were. As more and more material accumulates, permitting careful study of variation in one species after another, facts come to light that modify our conceptions of racial differences and our standard books should reflect such advances in knowledge. The application of this in the present instance is to urge, in any new edition of the A. O. U. *Check-List*, or any other general work on North American birds, a modification of the present mode of listing the local races of such birds as *Melospiza melodia.* In place of a string of heterogeneous subspecies, listed according to a chronological system true enough, but absolutely at haphazard as regards relationship, degree of difference, or geographical position, I would urge that, where possible, stress be placed upon the main divisions of the species with some subordination of the differences within each such section.

It is perhaps permissible to speculate somewhat as to the relationship borne by *rufina* and *morphna* toward *caurina,* immediately to the northward. *Rufina* in certain characters occupies an intermediate position between *morphna* and *caurina,* but geographically *morphna* (as here defined) impinges more directly upon the habitat of *caurina* than *rufina* does. It may seem startling to affirm the close resemblance of the Queen Charlotte Islands song sparrow to that of Yakutat Bay (see Brooks, Auk, XL, 1923, p. 223), but there is no gainsaying the similarity in size and, to some extent, in color and in shape of bill. Study of the map will demonstrate that the close relationship implied by such a claim is not so unreasonable as it first appears to be. Directly south of Glacier Bay extend the western islands of the Alexander Archipelago, and south of them the Queen Charlotte Islands. In many respects the animal life of the western islands differs markedly from that of the inner islands and the mainland, and it is easy to conceive of the dispersal of song sparrows in such a way as to produce different lines of variation in the two regions, west and east. Thus there might be produced in dispersal southward from the mainland, on the western islands and on the Queen Charlottes, a modification of the *caurina* type in which size remained the same, bill remained as long and nearly as slender, and color became darker and more brown. *Morphna,* in similarly hypothetical dispersal northward along the mainland coast, became slightly darker colored but otherwise almost unchanged. Something of the sort is what I believe really happened, with the resulting implication that *caurina* and *rufina* may be more nearly related, than are *morphna* and *rufina.*

There are two specimens at hand that have a decided bearing upon this theory, two breeding birds from Glacier Bay. One of these (Mus. Vert. Zool., no. 514, female, July 16, 1907), is an example of *caurina.* It may be taken as indicative of the southern extremity of the breeding range of that subspecies. The other (Mus. Vert. Zool., no. 512, male, July 2, 1907), is typical, not of *rufina,* but of *morphna.* In small size, ruddy color, and stubby bill, it is like breeding birds from Vancouver Island, rather than like those from the western islands of the Alexander Archipelago. These, the only adults at hand from Glacier Bay, are too few specimens to permit of any finality in the deductions made therefrom (especially in view of the variation exhibited in series from

other points), but the appearance of these birds fits well enough into the theory just outlined: that is, that the habitat of *morphna* extends northward on the mainland clear to the habitat of *caurina;* abrupt transition from one type to the other would be indicative of relatively remote relationship. *Rufina*, extending southward in its interrupted island range, would exhibit more or less intergradation with the closely related *caurina*, as is exhibited by many specimens. Intergradation between *rufina* and *morphna*, as certainly exists to a marked degree, might result from long ages of contact along a wide frontier.

The southernmost point from which I have seen a breeding specimen of *morphna* is Salem, Oregon. The type series of "*phaea*" from southern Oregon consists of winter birds. Rusty Song Sparrows are not uncommon in some parts of California during the winter months, and a number of specimens therefrom are included in the series studied. Birds from the coastal region are mostly of the reddish coloration seen in *morphna*; some are similar to the type series of "*phaea.*" From the interior of California there are many that in their grayish color tend distinctly toward *merrilli*. They are like birds from southeastern British Columbia, before described. I have seen no winter birds from southern localities that are like the song sparrows of the Queen Charlotte Islands and the western islands of the Alexander Archipelago. In this connection the possibility suggests itself of some birds from southern points that have been recorded as *caurina* being really examples of *rufina* from Chichagof, Baranof, or the Queen Charlotte Islands. Supposed examples of *caurina* from southern localities should be carefully examined with this point in mind; as I have pointed out, some specimens of *rufina* approach *caurina* very closely in appearance.

SPECIMENS EXAMINED

Melospiza melodia rufina

Alaska: Chichagof Island, 4 ad.; Baranof Island, 3 ad., 1 im., 2 juv.; Kuiu Island, 3 ad.; Warren Island, 2 ad.; Prince of Wales Island, 1 ad.; Forrester Island, 6 ad., 2 juv.; Duke Island, 2 ad.

British Columbia: Queen Charlotte Islands, 17 ad., 4 juv. (all from collection of the U. S. Biological Survey). Total 47.

Melospiza melodia morphna

Alaska: Glacier Bay, 1 ad., 1 juv.; Taku River, 7 im., 1 juv.; Port Snettisham, 1 im.; Thomas Bay, 1 ad., 2 juv; Chickamin River, 3 ad.; Boca de Quadra, 1 ad.; Admiralty Island, 4 ad.; Sergief Island, 3 ad., 7 im., 11 juv.

British Columbia: Upper Stikine River, 8 ad., 15 juv.; Hazelton, 9 ad., 3 juv.; Kispiox Valley, 3 ad., 7 im., 6 juv.; Vanderhoof, 3 ad., 4 juv.; Moose Lake, Yellowhead Pass, 1 ad., 1 juv. ("*inexspectata*"); Revelstoke, 2 ad.; Kamloops, 1 ad.; Elko, 1 ad.; Fernie, 1 ad. ("*merrilli*"); Trail, 3 ad. (2 "*merrilli*"), 1 juv.; Midway, 3 ad. (1 "*merrilli*"); Okanagan Landing, 1 ad., 1 im.; Osoyoos Lake, 11 ad.; Skagit River, 2 ad.; Chilliwack, 1 ad.; Vancouver, 1 ad.; Vancouver Island: Parksville, 10 ad.; Little Qualicum River, 30 ad., 4 juv.; French Creek, 7 ad., 1 juv.; Errington, 23 ad., 7 im., 7 juv.; Alberni, 17 ad., 17 juv.; Golden Eagle Basin, 1 juv.; Nootka Sound, 11 ad., 8 juv.

Alberta: Henry House, 1 ad.; Jasper Park, 4 juv. ("*inexspectata*").

Washington: Seattle, 3 ad., 3 juv.; Tacoma, 3 ad. (1"*merrilli*"); Nisqually Flats, 1 ad.

Oregon: Gardiner, 4 ("*phaea*"); Goldbeach, 3 ("*phaea*"); Tillamook, 1; Corvallis, 1; Salem, 1.

California: Siskiyou Mts., 3 (Oct. 30, Nov. 6, Dec. 5); Helena, Trinity Co., 3 (Feb. 15, 23, 24); Tower House Shasta Co., 2 (March 1, 7); Laytonville, Mendocino Co., 1 (Oct. 9); Fyffe, Eldorado Co., 2 (Nov. 25, 27); Coulterville, Mariposa Co., 2

MEASUREMENTS IN MILLIMETERS (AVERAGE, MINIMUM, AND MAXIMUM) OF SONG SPARROWS FROM POINTS BETWEEN CROSS SOUND, ALASKA, AND SOUTHERN OREGON

	Wing	Tail	Culmen	Depth of bill	Tarsus	Middle toe and claw
Melospiza m. caurina						
S E. Alaska, 10 males[1]	71.4 (69.0-73.0)	67.7 (64.0-72.5)	12.8 (12.0-13.5)	6.7 (6.2-7.0)	23.8 (23.0-24.2)	21.6 (21.0-22.0)
Melospiza m. rufina						
Queen Charlotte Ids., 10 males[2]	72.8 (70.0-75.5)	70.2 (68.0-75.8)	13.8 (12.5-14.8)	7.3 (7.0-7.8)	25.2 (24.5-26.5)	22.5 (22.0-23.0)
S E. Alaska, 10 males[3]	69.1 (66.0-71.5)	64.9 (60.2-69.0)	12.8 (12.0-13.8)	6.7 (6.2-7.2)	23.7 (21.2-25.0)	21.5 (21.0-22.5)
Melospiza m. morphna						
S E. Alaska, 10 males[4]	67.1 (63.0-69.5)	64.5 (58.0-69.0)	11.8 (11.0-12.5)	6.4 (6.0-7.0)	22.8 (21.2-23.5)	21.7 (20.5-23.0)
Telegraph Creek, B. C., 6 males	67.2 (64.0-71.0)	66.0 (62.8-69.0)	12.4 (12.0-12.8)	6.4 (6.2-6.5)	22.7 (22.0-23.5)	20.6 (20.2-21.5)
Hazelton, B. C., 10 males	66.5 (64.5-68.0)	65.5 (62.5-68.0)	12.2 (11.5-13.0)	6.2 (6.0-6.5)	22.4 (21.5-23.0)	20.6 (19.5-21.0)
Nootka Sound, Vancouver Id., 6 males	66.6 (64.5-68.0)	65.4 (61.0-68.0)	13.1 (12.5-13.8)	6.6 (6.5-6.8)	23.2 (22.5-24.0)	21.2 (20.2-22.2)
Little Qualicum R., Vancouver Id., 10 males	66.4 (64.5-68.0)	64.1 (60.5-68.0)	12.1 (11.0-13.0)	6.5 (6.0-7.0)	22.9 (21.2-24.2)	20.5 (19.5-21.2)
Southern British Columbia, 10 males[5]	66.7 (63.0-69.0)	64.7 (59.0-68.0)	11.6 (11.0-12.0)	6.3 (6.0-7.0)	21.9 (21.2-22,2)	19.5 (18.5-20.2)
Southern Oregon, 4 males[6]	64.2 (61.8-67.5)	61.9 (60.0-65.0)	11.5 (11.2-11.8)	6.6 (6.5-6.8)	23.5 (23.0-24.0)	20.7 (20.2-21.0)

1. Kuiu Id., 4; Admiralty Id., 4; Baranof Id., 1; Sergief Id., 1; all migrants.
2. Cumshewa Inlet, 6; Skidegate, 1; Louise Id., 1; Prevost Id., 2.
3. Sitka, 2; Chichagof Id., 2; Kuiu Id., 2; Warren Id., 1; Prince of Wales Id., 1; Forrester Id., 2.
4. Taku River, 5; Admiralty Id., 2; Sergief Id., 1; Chickamin River, 1; Boca de Quadra, 1.
5. Skagit River, 1; Chilliwack, 1; Okanagan Landing, 2; Midway, 2; Trail, 3; Fernie, 1.
6. **"Melospiza m. phaea"**: Goldbeach 1; Gardiner, 3.

(Nov. 26, March 3); Snelling, Merced Co., 1 (Jan. 6); Grizzly Id., Solano Co., 1 (March 14); Nicasio, Marin Co., 2 (April 9, 14); Oakland, 2 (Dec. 4, Jan. 7); Santa Cruz Mts., 1 (Nov. 25); Riverside, 1 (Nov. 3). Total, 322.

Berkeley, California, September 15, 1923.

EDITORIAL NOTES AND NEWS

For preparing this year's annual index, which concludes the present issue, the editors of THE CONDOR are indebted to Mr. Frank N. Bassett.

The forty-first stated meeting of the American Ornithologists' Union was held at the Museum of Comparative Zoology, Cambridge, Massachusetts, October 9 to 11, 1923. The attendance was large, including 24 of the Fellows. A total of 43 papers was presented, covering a very wide range of topics. Elections included Dr. Chas. W. Townsend to the class of Fellows, and Messrs. Chas. D. Bunker, Joseph Dixon and George F. Simmons to the class of Members.

Pacific Coast Avifauna number 15, Florence Merriam Bailey on "Birds Recorded from the Santa Rita Mountains in Southern Arizona," was issued on November 8, 1923. This contribution is published under the auspices of the Cooper Ornithological Club, the cost of printing having been met by money donations from certain of the members who are actively interested in the development of southwestern ornithology. This new number in the Avifauna series will, we feel confident, prove of distinct credit to all concerned. Studies of this high standard are needed from a great many other western areas which possess marked faunal individuality.

It is with deep sorrow that we record the death of Winifred N. Wear, which took place after a brief illness, at Fresno, California, September 4, 1923. Miss Wear was long a member of the Cooper Ornithological Club, always active in promoting those interests for which the Club stands. She was a successful teacher in the public schools and for the last four years of her life was Principal of the Chowchilla School. She was ever alert to introduce and foster the study of natural history in the schools of the San Joaquin Valley. The cause of bird study in that region has suffered the loss of a tireless and conscientious worker. There is no one now in view to take her place.

PUBLICATIONS REVIEWED

PREBLE AND MCATEE ON THE FAUNA OF THE PRIBILOFS.*—It is good to see another number in the North American Fauna series. We had been afraid that governmental economy had singled out this series for elimination altogether, or at least for reduction. The present number (46) is reassuring in this regard, as also because of its high standard of scientific content—equal to the best of its predecessors of like nature.

Preble and McAtee give a very interesting analysis of the avifauna of the Pribilof Islands. This is a group of rather sequestered location in Bering Sea, though situated considerably nearer the Alaskan shore than the Siberian shore. A total of 137 species of birds has been definitely indentified from the Pribilofs. Only 23 of these are known to breed there, and of these 23, 19 are water birds, and only 4 species are of endemic land birds. The striking thing about the whole list is the proportion of stragglers—casual visitants or at best very irregular migrants. These strays in all cases very probably hail from the neighboring coasts of Asia and America. A great many of the records are based on just one known occurrence; and additions of this kind of record may be expected to continue far into the future, almost as long as keen observers are located on the islands. No less than 14 species are now on the North American list solely because of their casual occurrence on the Pribilof Islands.

The authors think that all these cases of straggling are to be accounted for on the basis of bewilderment of individuals driven out to sea by high winds. Such lost birds would be attracted by the sight

*U. S. Dept. Agric., Bur. Biological Survey, N. Am. Fauna No. 46, 1923 ["actual date of publication, June 20", but our copy not received until August 24], pp. iv+256, 15 pls.: A Biological Survey of the Pribilof Islands, Alaska: I. Birds [pp.10-101] and Mammals, by Edward A. Preble and W. L. McAtee; II, Insects, Arachnids, and Chilopods, by various entomologists, with an introduction by W. L. McAtee.

of land in clear weather; while in foggy weather the noise from the herds of fur seals and sea lions might serve as the guiding agency. This latter is a novel type of landmark. We were not previously aware that ocean signals (sirens, bell buoys, and the like) might reasonably be supposed to act in deflecting the flight courses of birds!

A comparatively new feature, in faunal papers, is the inclusion of considerable data in regard to the food of the birds. Detailed analyses of stomach contents are given for most of the species. It is remarked that two-winged flies preponderated in the food of the birds which fed on land; while with the sea birds a great diversity of organisms living in the kelp beds furnished the predominant supply. These "kelp pastures" proved to be "the richest sort of feeding places for omnivorous birds", both summer and winter. Insufficient and monotonous diet is *not* a characteristic of Boreal seas. There is an abundance of food, in great variety and permanent supply, and this doubtless accounts for the fact that bird life in Bering Sea is so prolific throughout the year.

The reviewer could point out many noteworthy things in the accounts of individual species, as well as in the nomenclature employed, but space forbids. Suffice it to say that the staff of the Biological Survey, more particularly the authors of the vertebrate portion of the present paper, Preble and McAtee, are to be credited with another first-class contribution.—J. GRINNELL, *California Museum of Vertebrate Zoology, Berkeley, September 1, 1923.*

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

AUGUST.—The regular meeting of the Northern Division, Cooper Ornithological Club, was held at the Museum of Vertebrate Zoology, Berkeley, Thursday, August 23, at 8 P. M. President Cooper was in the Chair, and attendance was as follows: Members Misses Beaman, Bennet, Burk, C. Flinn, H. Flynn, Thomson, Van Gaasbeek, and Wythe; Mesdames Allen, Bogle, Frederick, Grant, Grinnell, Mexia, and Roe; Messrs. Dixon, Elmore, J. Grinnell, Willard Grinnell, Labarthe, Swarth, Wheeler. Visitors: Mrs. Thomson and Mrs. Wheeler.

Minutes of the August meeting of the Northern Division were read and approved and the name of Mr. Edgar Locke Lazier, Reed College, Portland, Oregon, was proposed for membership in the club by J. Grinnell. Different members then contributed accounts of their vacation experiences, after which the meeting adjourned.—AMELIA S. ALLEN, *Secretary.*

SOUTHERN DIVISION

JUNE.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Thursday Evening, June 28, 1923, at 8 P. M., with Vice-President Wyman in the chair. Members present were: Misses Burnell and Miller; Messrs Cantwell, Chambers, Barnes, Dickey, Hanaford, Reis, Robertson, and Ross. Visitors were: Mrs. Reis and Mr. Owen.

Minutes of the May meeting were read and approved. New names proposed for membership were: Miss Mary Bell Keefer, 605 Wallace Avenue, Covington, Kentucky, by R. T. Kellogg, Silver City, New Mexico; Mrs. Charles A. Harris, Box 8, Glendora, California, by Dr. C. H. Wood; Everett F. McBride, Box P, Fellows, California, by A. van Rossem; Thomas Guy Shafer, 2101 23d Avenue, Oakland, California, by W. Lee Chambers.

An invitation of the Cooper Club to hold a joint meeing with the Friends of Our National Parks Society, on October 25, 1923, was read. Mr. Robertson moved, seconded by Mr. Reis, that the Secetary be instructed to accept the invitation; motion carried.

Mr. Robertson presented to the Southern Division, on behalf of Mrs. Frank S. Daggett, the late Mr. Daggett's books containing bird notes and letters from various bird men throughout the country. These books will be added to the library of the Southern Division, which is always available to Cooper Club members. They will also be of value to the Daggett Bird Collection which was purchased by the Los Angeles Museum. Mr. Dickey moved that the secretary be instructed to write a letter of appreciation to Mrs Daggett, expressing thanks for her interest in the Club. Seconded by Mr. Barnes and carried.

Informal discussion: Mr. Wyman gave a short talk on Central American birds. Mr. Dickey gave a very interesting account of his recent visit to Laysan Island. Meeting adjourned.—LUTHER LITTLE, *Secretary.*

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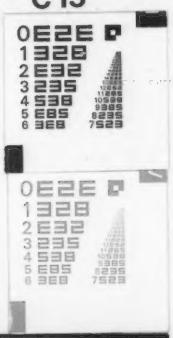
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